R&D TOPGUNS AT YOUR SERVICE

Get The Right Stuff to …

– *Intelligently shop* for your electronics or software.

– *Audit* or *certify* manufacturers that you engage.

– Transform your concepts into *product requirements, specifications*, and *acceptance criteria.*

– *Compose and execute a realistic test plan*, tailored to your budget and target confidence levels.

– *Design*, *build*, *integrate*, *verify,* and *validate* your electronics, avionics, software, or system.

– Create or improve your *bar code application*.

– *Deliver your software on time, to specification*. Our programmers have wealth of commercial and government project experience.

Laurence E. LaForge, PhD, President and CEO. Previously professor with Embry-Riddle Aeronautical University. Three-time NASA Fellow, twice at the Jet Propulsion Laboratory; contributor, *Deep Space 1*. Principal Engineer, Digital Equipment Corporation, now part of Hewlett Packard: contributor to the VAX/VMS 8600, and to CHAS, a pioneering CAD/CAM suite for integrating VLSI design domains. More than 40 publications, including articles in the *IEEE Transactions on Computers*, the *IEEE Transactions on Reliability*, and the *IEEE Transactions on Parallel and Distributed Processing*. Baccalaureate: Massachusetts Institute of Technology. PhD: McGill University. Member, Institute for Electrical and Electronics Engineers.

CREATE OR IMPROVE YOUR BAR CODE APPLICATION

Imagine the bar code applications we will craft for *you*! For example, our own RightCardWare software family bolsters person-to-person convenience. RightCardWare creates a high-density bar code containing name, telephone number, and more. This contact information can be typed, imported from programs like Microsoft Outlook, or read in from .VCF vCard files you may have seen attached to emails. RightCardWare prints these bar codes onto the backs of business cards. Client: Symbol Technologies.

Using our RightCard*Reader* software, scan bar-coded business cards into Outlook, CardScan, or other personal information manager. Similar to Acrobat Reader, RightCardReader is free of charge. Error-free, and at the touch of a button, the RightCardWare family integrates *standard* papers, inks, printers, and scanners. Imagine the bar code applications we will craft for *you*!

The Right Stuff
of Tahoe, Incorporated

As a Matter of Fact, We ARE Rocket Scientists[TM]

Deep Space 1, first probe propelled by an ion engine. Right Stuff of Tahoe professionals contributed to the avionics, power, and software subsystems

R&D TOPGUNS AT YOUR SERVICE

We solve problems. Let us solve *yours*.

– Electronics, software, mathematics
– Probability and combinatorics for the gaming industry
– ZigBee and 802.15.4 wireless networking
– Wind turbine metrology and SCADA: supervisory control and data acquisition
– The Handle System: applications and CNRI Java reference implementation
– Bar codes: printing, scanning, databases
– From basic research to mission-critical dependability
– Analysis, development, testing
– Products and requirements
– Software quality, scheduling, version control: Trac, Subversion, TortoiseSVN

CONTACT US

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FROM MATHEMATICS, TO SOFTWARE, TO ELECTRONICS

Imagine the modeling and test software we will craft for *you*! As shown below, for example, our own Connection Foundry family of software analyzes and synthesizes connectivity, using adaptive radio-frequency (RF) algorithms for conserving power in mobile *ad hoc* networks (MANETs). Client: Department of Homeland Security.
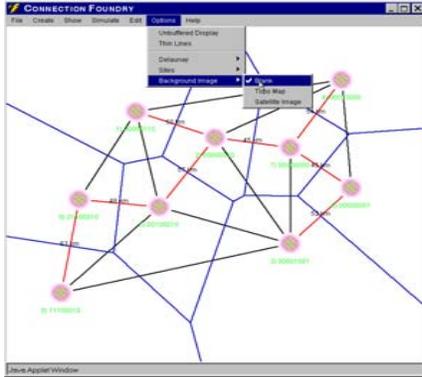
Screenshot above: one frame in a sequence illustrating RF channels whose power gains or shrinks, or which connect and disconnect, in response to the motions of nodes. Nodes represent software defined radios. **Red** and **black**: point-to-point RF channels correspond to the *Delaunay triangulation*, as it is known in the field of *computational geometry*. In **blue**: *Dirichlet cells* comprise the *Voronoi diagram*, mathematical *dual* of the Delaunay triangulation. Below: physical layer model, 16-node MANET, constant channel bit rate, constrained signal-to-interference-or-noise. Client: Department of Defense. Imagine the modeling and test software we will craft for *you*!
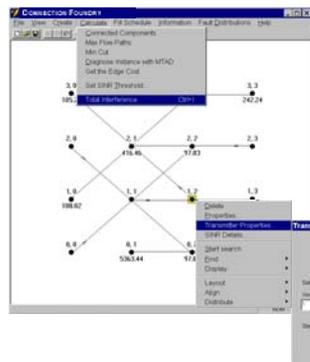
$$\frac{W_r}{W_t} = \frac{G_r G_t}{(4\pi d/\lambda)^2}$$

Receive, transmit gain: G_r, G_t
Receive, transmit power: W_r, W_t
d/λ: separation, in wavelengths

FROM BASIC RESEARCH

System dependability doesn't "just happen" on a wing and a prayer. It is a deliberate consequence of *disciplined engineering based on solid science*. More than ever, *mathematics* is a crucial cornerstone of science. Imagine the scientifically sound systems we will craft for *you*! For example, and as shown below, *dedicated* sparing is a classical way to organize redundancy. To achieve a fault-free array, replace entire rows and columns with rows and columns dedicated as spares. Variations on dedicated sparing continue to dominate integrated circuits – especially memories – that are designed for high reliability or yield.

ARCHITECTURAL BEHAVIOR

Configuration rules,
scale parameter t:

1. Any at of $(a+c)t$ columns may be selected from the $t \times at$ nominal array and ct spare columns.

2. Any t of $(1+b)t$ rows may be selected from the $t \times at$ nominal array and bt spare rows.

3. The columns of the spare rows may be connected, using at disjoint paths, to the columns selected by rule 1.
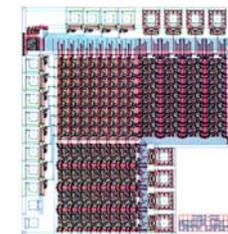
Selected 🟩
Not selected 🟨
Failure proportion p
Fault **X**

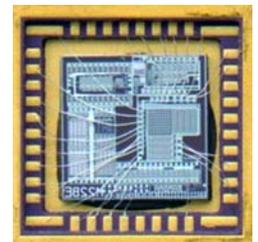### CLASSICAL FAULT TOLERANT ARRAY: ROWS AND COLUMNS *DEDICATED* AS SPARES
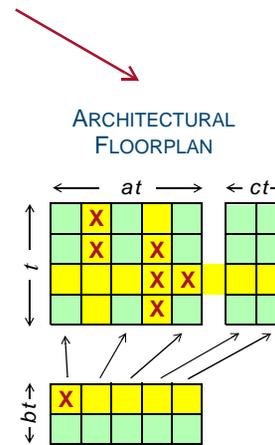
ARCHITECTURAL FLOORPLAN

COUNT ON THE RIGHT STUFF TO DELIVER ELECTRONICS AND AVIONICS THAT TOLERATE DEFECTS LIKE THESE:

SRAM metal-to-metal short circuit

DRAM transistor gate oxide pinhole

TO MISSION-CRITICAL DEPENDABILITY

Since integrated circuit *area* is a prime determinant of both cost and yield, you should *quantify* the amount of redundancy to build: neither too little nor too much. Since signal delay increases as the square of wirelength, you should know how to minimize the length of the longest wire. The Right Stuff of Tahoe is one of a very few firms that can optimize redundancy and wirelength, and then transform the attendant formulas into *practical* designs that achieve your objectives for dependability. Imagine the scientifically sound systems we will craft for *you*!

Area redundancy ∝ element redundancy, between

$$\left(\frac{1}{at}+\frac{1}{t}\right)\ln^t\left[\frac{1}{1-p}\right]-1 \quad \text{and} \quad \frac{at}{(1-p)^{2t}}-at$$

Maximum wirelength between $t^{-1}[-\ln(1-p)]^t$ and $(1-p)^{-t}$

L. E. LaForge. What designers of microelectronic systems should know about arrays spared by rows and columns. *IEEE Transactions on Reliability*. **39** (3), Sep-2000. 251-272

TRANSISTOR LEVEL LAYOUT
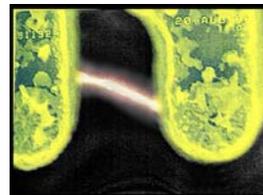

CHIP FABRICATED AND BONDED

Designed by
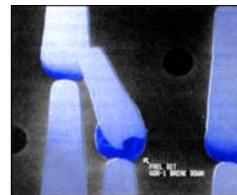Right Stuff of Tahoe President
Dr. Laurence E. LaForge

Client: Hewlett Packard Corporation

Wonder if you can do better than dedicated sparing? You *bet* you can! *Much* better, in fact. Contact us!